

SRT 346 User's Manual

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Introduction to SRT 346

SRT 346 is a quad-band GSM device equipped with various alarm sensors and a simple, user-accessible interface. It is primarily intended to be placed on car consoles by use of adequately sized, wireless charging capable holder. Thanks to its extremely low power consumption features and portable size, it is perfectly fit to be used on-the-go as a standard personal alarm/tracking device.

Scope

This document describes general hardware specifications.

The product is based on a Sierra Wireless AirPrime™ SL6087 EDGE module which uses a specifically tuned integrated antenna. Device hardware includes MediaTek based GNSS solution and RF based short-range radio solution for positioning and provides Bluetooth support for wireless communication with manufacturer approved accessories.

General Characteristics

General

- Quad-band (850/900/1800/1900 MHz) EDGE connectivity
- Class 4 (2W) for GSM 850 and E-GSM
- Class 1 (1W) for DCS and PCS
- Fully type approved according to GSM Phase 2+ specifications
- GPRS multislot class 10
- EGPRS multislot class 10
- OTA configuration
- GNSS receiver
- RF Transceiver for positioning and data transmission as GSM back-up
- Bluetooth support
- Wireless charging

Electrical

- Integrated 3.7V Li-ion battery with 2000mAh minimum capacity
- Maximum 2A peak power consumption during transmission pulses in GSM 900 at 2W
- 5V DC charge voltage with 750 mA maximum charge current

Physical

- 118x73x26 mm dimensions
- Weight 160 g
- Operating temperature: -20°C to +55°C
- Storage temperature: -35°C to +85°C

Interfaces

- Integrated GSM antenna
- Integrated GNSS antenna
- Integrated Bluetooth antenna
- Man-Down and Timer alarms active status indicators
- RF tag detection indicator
- GSM status indicator
- GPS status indicator
- Charge/Battery status indicator
- Easily accessible SIM card holder with 1.8V/3V SIM interface
- Integrated Li-ion battery
- On/Off button
- Alarm button
- Call button
- Timer button
- Five individually programmable function buttons (can be optionally converted to external input contacts)
- Relay connection
- External microphone & speaker contacts
- Integrated vibrator / buzzer
- Integrated vibration sensor
- Integrated DTMF decoder
- Integrated wireless charging circuitry

Safety Precautions

RF Exposure

General Statement on RF Energy

Your personal protection device contains a transmitter and a receiver. When it is ON, it receives and transmits RF energy. When you communicate with your personal protection device, the system handling your communication controls the power level at which your personal protection device transmits.

Specific Absorption Rate (SAR)

Your personal protection device is a radio transmitter and receiver. It is designed not to exceed the limits of exposure to radio waves recommended by international guidelines. These guidelines were developed by the independent scientific organization ICNIRP and include safety margins designed to assure the protection of all persons, regardless of age and health.

The guidelines use a unit of measurement known as Specific Absorption Rate, or SAR. The SAR limit for mobile devices is 2.0 W/kg and the highest SAR value for this device was 0.758 W/kg*. As mobile devices offer a range of functions, they can be used in other positions, such as on the body as described in this document.

As SAR is measured utilizing the device's highest transmitting power, the actual SAR of this device while operating is typically below that indicate above. This is due to automatic changes to the power level of the device to ensure it only uses the minimum power required to communicate with the network.

Body Worn Operation

Important safety information regarding radio frequency radiation (RF) exposure.

To ensure compliance with RF exposure guidelines the device must be used with a minimum of 15 mm separation from the body. Failure to observe these instructions could result in your RF exposure exceeding the relevant guideline limits.

Limiting Exposure to Radio Frequency (RF) Fields

For individuals concerned about limiting their exposure to RF fields, the World Health Organization (WHO) provides the following advice:

Precautionary measures: Present scientific information does not indicate the need for any special precautions for the use of mobile phones. If individuals are concerned, they might choose to limit their own or their children's RF exposure by limiting the length of calls, or using 'hands-free' devices to keep mobile phones away from the head and body.

*The tests are carried out in accordance with the standards EN 50360, EN 62209-1 and EN 62209-2.

Distraction

Driving

Full attention must be given to driving at all times in order to reduce the risk of an accident. Using your equipment while driving causes distraction and can lead to an accident. You must comply with local laws and regulations restricting the use of wireless devices while driving.

Operating Machinery

Full attention must be given to operating the machinery in order to reduce the risk of an accident.

Product Handling

General Statement on Handling and Use

You alone are responsible for how you use your personal security device and any consequences of its use. You must always switch off your personal security device wherever the use of a mobile phone is prohibited. Use of your personal security device is subject to safety measures designed to protect users and their environment.

- Always treat your personal security device and its accessories with care and keep it in a clean and dust-free place.
- Do not expose your personal security device or its accessories to open flames or lit tobacco products.
- Do not expose your personal security device or its accessories to liquid, moisture or high humidity.
- Do not drop, throw or try to bend your personal security device or its accessories.
- Do not use harsh chemicals, cleaning solvents, or aerosols to clean the device or its accessories.
- Do not paint your personal security device or its accessories.
- Do not attempt to disassemble your personal security device or its accessories, only authorized personnel must do so.
- Do not expose your personal security device or its accessories to extreme temperatures.
- Please check local regulations for disposal of electronic products.
- Do not carry your personal security device in your back pocket as it could break when you sit down.

Small Children

Do not leave your personal security device and its accessories within the reach of small children or allow them to play with it. They could hurt themselves or others, or could accidentally damage the device. Your personal security device contains small parts with sharp edges that may cause an injury or which could become detached and create a choking hazard.

Demagnetisation

To avoid the risk of demagnetization, do not allow electronic devices or magnetic media close to your personal security device for a long time.

Electrostatic Discharge (ESD)

Do not touch the SIM card's metal connectors.

Air Bags

Do not place a personal security device in the area over an air bag or in the air bag deployment area. Store the personal security device safely before driving your vehicle.

Seizures/ Blackouts

The personal security device can produce a bright or a flashing light.

Emergency Calls

This equipment, like any wireless phone, operates using radio signals, which cannot guarantee connection in all conditions. Therefore, you must never rely solely on any wireless phone for emergency communications.

Loud Noise

This equipment is capable of producing loud noises which may damage your hearing.

Phone Heating

This equipment may become warm during charging and during normal use.

Electrical Safety

Accessories

Use only approved accessories. Do not connect with incompatible products or accessories.

Faulty and Damaged Products

Do not attempt to disassemble the equipment or its accessory. Only qualified personnel must service or repair the equipment or its accessory. If your equipment or its accessory has been submerged in water, punctured, or subjected to a severe fall, do not use it until you have taken it to be checked at an authorized service center.

Interference

General Statement on Interference

Care must be taken when using the phone in close proximity to personal medical devices, such as pacemakers and hearing aids.

Pacemakers

Pacemaker manufactures recommend that a minimum separation of 15 cm be maintained between a mobile phone and a pacemaker to avoid potential interference with the pacemaker. To achieve this, use the equipment on the opposite ear to your pacemaker and do not carry it in a breast pocket.

Hearing aids

People with hearing aids or other cochlear implants may experience interfering noises when using wireless devices or when one is nearby. The level of interference will depend on the type of hearing device and the distance from the interference source, increasing the separation between them may reduce the interference. You may also consult your hearing aid manufacturer to discuss alternatives.

Medical Devices

Please consult your doctor and the device manufacturer to determine if operation of your equipment may interfere with the operation of your medical device.

Hospitals

Switch off your wireless device when requested to do so in hospitals, clinics or health care facilities. These requests are designed to prevent possible interference with sensitive medical equipment.

Aircraft

Switch off your wireless device whenever you are instructed to do so by airport or airline staff.

Interference in Cars

Please note that because of possible interference to electronic equipment, some vehicle manufactures forbid the use of mobile phones in their vehicles.

Explosive Environments

Petrol Stations and Explosive Atmospheres

In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other radio equipment.

Areas with potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust or metal powders.

Blasting Caps and Areas

Turn off your mobile phone or wireless device when in a blasting area or in areas posted turn off "two-way radios" or "electronic devices" to avoid interfering with blasting operations.

Declaration of RoHS Compliance

To minimize the environmental impact and take more responsibility to the earth we live in, this document shall serve as formal declaration that the SRT 346 manufactured by SCANDINAVIAN RADIO TECHNOLOGY AB is in compliance with the Directive 2002/95/EC of the European Parliament – RoHS (Restriction of Hazardous Substances) with respect to the following substances:

- (1) Lead (Pb)
- (2) Mercury (Hg)
- (3) Cadmium (Cd)
- (4) Hexavalent Chromium (Cr (VI))
- (5) Polybrominated biphenyls (PBB's)
- (6) Polybrominated diphenyl ethers (PBDE's)

(Compliance is evidenced by written declaration from our suppliers, assuring that any potential trace contamination levels of the substances listed above are below the maximum level set by EU 2002/95/EC, or are exempt due to their application.)

The SRT 346 manufactured by SCANDINAVIAN RADIO TECHNOLOGY AB, meets the requirements of EU 2002/95/EC.

WEEE Notice

The Directive on Waste Electrical and Electronic Equipment (WEEE), which entered into force as European law on 13th February 2003, resulted in a major change in the treatment of electrical equipment at end-of-life. The purpose of this Directive is, as a first priority, the prevention of WEEE, and in addition, to promote the reuse, recycling and other forms of recovery of such wastes so as to reduce disposal.



1. When this crossed-out wheeled bin symbol (WEEE logo) is attached to a product it means the product is covered by the European Directive 2002/96/CE.
2. All electrical and electronic products should be disposed of separately from the municipal waste stream via appointed by the government or the local authorities.
3. The correct disposal of your old appliance will help prevent negative consequences for the environment and human health.

For more information about electronic and electrical waste equipment disposal, recovery, and collection points, please contact your local city centre, household waste disposal service, shop from where you purchased the equipment, or manufacturer of the equipment.

EC DECLARATION OF CONFORMITY

The undersigned, representing the following manufacturer

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herewith declares that the product

<i>Type of equipment:</i>	Portable GSM/GPRS/GPS device
<i>Brand name/trade mark:</i>	SRT 346
<i>Model/type:</i>	SRT 346
<i>Batch/serialnumber:</i>	35919303 000000 to 35919303999999

complies with the essential requirements of Article 3 of the R&TTE 1999/5/EC directive. The following standards have been applied:

<i>Reference no</i>	<i>Title</i>
EN 60 950-1:2005 EN 60 950-1/A11:2009	<i>R&TTE Directive related to safety</i>
EN 301 489-1 V1.8.1 EN 301 489-7 V1.3.1	<i>R&TTE Directive related to electromagnetic compatibility</i>
EN 301 511	<i>R&TTE Directive related to efficient use of radio frequency spectrum</i>
EN 50360 (2001-07) EN 62209-1 (2006-03) EN 62209-2 (2010-02)	<i>Human exposure to electromagnetic fields</i>

Vällingby 2014-12-01



Tahir Albayrak
Managing Director of Scandinavian Radio Technology AB

Hardware

Battery & Charger

Battery

SRT 346 includes an integrated rechargeable Li-Ion battery with a nominal voltage of 3.7V and minimum capacity of 2000mAh. The included battery satisfies all the requirements regarding ripple, internal resistance and peak current capacity.

The battery in SRT 346 may not be changed or replaced by a user.

Charger

SRT346 is equipped with a wireless (inductive) charging hardware which provided the benefit of charging without cable connection. Compatible charging station (pad, dock or car holder) is provided with the device.

SRT346 can optionally be offered with car charger equipment which is suitable to plug in 12-volt outlet. The charge contact can be found at the bottom of the unit.

The charging process is indicated with the Battery Level Indicator and will stop automatically when the battery reaches maximum capacity. If the charger remains connected to the unit or the unit still remains on the charge stand while the unit is running, battery charging will start again when the battery level drops below a certain limit.

The charge current is maximum 750mA.

For optimal performance, SRT 346 should be charged while in an environment with temperature between 0°C and 45°C.

Battery Level Indicator

The Battery Level Indicator is a two-colour LED that indicates battery level, charger progress and shutdown progress.

Battery Level Indication

When no charger is connected and the unit is OFF, the LED will be off.

When no charger is connected and the unit is ON, the LED indicates the current battery level with three flashes every 15 seconds as follows:

Green-Green-Green:	Battery level is good
Green-Green-Red:	Battery level is fair
Green-Red-Red:	Battery level is low
Red-Red-Red:	Battery level is very low

Charger Indication

When a charger is connected, the Battery Level Indication is suspended in favour of Charger Indication.

When charger is connected and the unit is OFF, the LED will flash with a Red light until the charging is complete. When the charging is complete, the LED will stop flashing but will stay Red until either the charger is removed, or charging is needed again.

When charger is connected and the unit is ON, the LED will flash with a Green light until the charging is complete. When the charging is complete, the LED will stop flashing but will stay Green until either the charger is removed, or charging is needed again.

Shutdown Indication

When the unit is turned OFF, the unit indicates that shutdown is in progress by flashing the LED between Red and Green until shutdown is complete, or the unit is turned ON again.

Shutdown Indication takes priority over both Charger Indication and Battery Level Indication and the LED will operate normally once the shutdown state is cleared.

Low Battery Voltage Detection

The battery voltage level is constantly monitored. Aside from the battery level indication, the unit can be put in Low Battery Voltage Mode and No GSM Mode depending on the battery level.

Low Battery Voltage Mode

SRT 346 enters the Low Battery Voltage Mode when the battery level has been below 3.65V, and a Low Battery Voltage Alarm is generated depending on configuration.

To clear the Low Battery Voltage Mode, the battery level must be above 3.80V for 2.5 minutes.

While the unit is in low battery mode, all functions work as normal.

No GSM Mode

SRT 346 enters the No GSM Mode at a battery level of 3.3V, and the unit will shut down.

To clear the No GSM Mode, the battery level must be above 3.80V for 4.25 minutes.

While in No GSM Mode, all alarms and other functionality is turned off. If there are any pending alarms when the unit enters No GSM Mode, these alarms will be sent when No GSM Mode is cleared.

SIM Card Holder

A 1.8V/3V SIM Card Reader is integrated in SRT 346. The SIM interface signals are protected by transient voltage suppression diodes to prevent any Electro Static Discharge.

The interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.

GSM

RF Characteristics

RF performance is compliant with the ETSI GSM 05.05 recommendation.

The main receiver parameters are:

- GSM850 Reference Sensitivity = -109 dBm
- E-GSM900 Reference Sensitivity = -109 dBm
- DCS1800 Reference Sensitivity = -108 dBm
- PCS1900 Reference Sensitivity = -108 dBm
- Selectivity @ 200kHz: > +9dBc
- Selectivity @ 400kHz: > +41dBc
- Linear dynamic range: 63dB
- Co-channel rejection: >= 9dBc

The main transmitter parameters are:

- Maximum output power (EGSM & GSM850): 33dBm $\pm$ 2dB at ambient temperature
- Maximum output power (GSM1800 & PCS1900): 30dBm $\pm$ 2dB at ambient temperature
- Minimum output power (EGSM & GSM850): 5dBm $\pm$ 5dB at ambient temperature
- Minimum output power (GSM1800 & PCS1900): 0dBm $\pm$ 5dB at ambient temperature

Antenna

The integrated antenna meets the following requirements:

Characteristic		E-GSM 900	DCS 1800	GSM 850	PCS 1900
TX Frequency		880 to 915 MHz	1710 to 1785 MHz	824 to 849 MHz	1850 to 1910 MHz
RX Frequency		925 to 960 MHz	1805 to 1880 MHz	869 to 894 MHz	1930 to 1990 MHz
Impedance		50Ω			
VSWR	Rx max	1.5:1			
	Tx max	1.5:1			
Typical radiated gain		0dBi in at least one direction			

GSM Status Indicator

The GSM Status Indicator is a two-colour LED that indicates GSM module status, network coverage and ongoing voice call progress.

When the LED is not on, GSM module is powered OFF (Note that SRT 346 may still be ON).

When the LED is blinking red, the unit is trying to connect to the GSM network.

When the LED is blinking green slowly, the unit is on and ready to process alarms and calls.

When the LED is blinking green rapidly, the unit is on and a voice call is in progress.

User Buttons

SRT 346 button interface provides ten pushbuttons where each one is marked with icons relevant to respective purpose of use.

Function buttons labelled from 'F1' to 'F5' can be optionally converted to external input contacts.

On/Off Button

SRT346 is turned on or off when On/Off button is pressed and hold for 5 seconds; until device vibrates/beeps once to confirm the input.

Alarm Button

Alarm Button is made relatively larger for easier access and is used to generate Pushbutton Alarm which can be configured in various ways to depending on the application. The intended usage is to only press this button in case of emergency.

Pushbutton can also be used to verify communication between the device and receiver party when the button is pressed five times in a row and the period of each press and release is no more than the actual alarm button detection time. When these requirements are met, all procedures configured for an actual Pushbutton alarm is put in action while the alarm is reported with a different code so that receiver party is made aware that alarm is triggered for test purposes.

Call Button

With the Call Button a single pre-configured number can be called up. This button is also used to generate a Status Check Alarm if call button function is not enabled.

Timer Button

Timer (Passivity) alarm is used to report situations of when user becomes unable to interact with the device after a specified period of time expires.

Timer button activates or deactivates Timer alarm monitoring when pressed and hold for 5 seconds longer than specified period of time for call button detection.

Once Timer alarm monitoring is active, Timer button is used to buy time (i.e. restart timer countdown) when pressed and hold for the specified period of time for call button detection.

Timer alarm active status is indicated by the yellow LED that is placed above Timer button. The LED rapidly flashes 5 times to confirm function activation or deactivation. It also flashes every second as long as Timer alarm monitoring stays in progress.

The function will also be de-activated when the unit is turned off, the unit enters low battery mode and when connected to charger in some modes.

ManDown Button

ManDown alarm is used to report situations of when user becomes injured or unconscious by constantly monitoring up-right position of body posture.

ManDown button activates or deactivates ManDown alarm monitoring when pressed and hold for 5 seconds longer than specified period of time for call button detection.

ManDown alarm active status is indicated by the yellow LED that is placed above ManDown button. The LED rapidly flashes 5 times to confirm function activation or deactivation. It also flashes every second as long as ManDown alarm monitoring stays in progress.

The function will also be de-activated when the unit is turned off, the unit enters low battery mode and when connected to charger in some modes.

Function Buttons

There are five generic function buttons with configurable detection time and detection method. Each button can be individually configured to control built-in relay operation and generates a unique alarm code which specifies the button pressed.

Active status of function buttons when configured in toggle mode is indicated by flashing green LEDs placed above each button.

Button inputs can also be wired in order to be used as external contacts for the purpose of generating alarms by various input methods depending on how the contacts are installed.

Relay

Built-in relay can be activated or de-activated either automatically by preset configuration for when specified function button status changes or manually by upon reception of respective action commands via SMS.

Audio

Microphone & Speaker

SRT346 can optionally be equipped with external microphone and speaker.

DTMF

SRT 346 has a built-in DTMF decoder that can be used to authenticate the receiver of an alarm call.

Vibrator/Buzzer

- SRT346 can be equipped with either a buzzer or a vibrator which is used to indicate various events, such as:
- Incoming Voice Call and SMS
- Button input detection
- Alarm Report transmission success
- Alarm Call connect success
- Connection hang-up after successful Alarm Call

Vibration Sensor

The Vibration Sensor can be used to generate alarms in case of vibration or no-vibration, as well as be used for battery savings operations.

When used for battery savings operations, no Vibration Sensor Alarms will be generated and the unit will enter idle mode after a time when no vibrations are detected at all.

RF Transceiver

In addition to GNSS based positioning, SRT346 provides the possibility to enhance positioning methods thanks to the built-in RF module operating on ISM band. Same module can be used to receive user-defined position messages broadcasted by SRT manufactured RF tags (SRT334) as well as transmit alarm reports in lack of GSM network connection.

RF Status Indicator

The RF Status Indicator is a green LED that indicates if the unit is in contact with a RF tag (SRT334).

When the LED is not on, the radio module is either turned off or there is no RF tag nearby.

When the LED is flashing, the unit is effectively in contact with a RF tag (SRT334).

RF Antenna

General characteristics:

- Frequency Range : 2400-2500 MHz
- Radiation Efficiency > 70%
- Peak Gain >2 dBi
- VSWR <2:1
- Polarization :Linear

Bluetooth Module

Bluetooth support applies to SRT approved Bluetooth accessories only.

General characteristics are as follows:

- Fully embedded Bluetooth® v3.0
- Class 2 module
- 128-bit encryption security
- FCC and Bluetooth® qualified
- Multipoint capability

Bluetooth Antenna

General characteristics:

- Sensitivity level BER < .001 with DH5 -86 dBm
- Maximum usable level BER < .001 with DH1 0 dBm
- Input VSWR 2.5:1
- Maximum output power 50 ohm load 0 dBm
- Initial carrier frequency tolerance 0 kHz
- 20 dB bandwidth for modulated carrier 935 kHz

GNSS

GNSS Receiver

General characteristics:

- GPS, GALILEO, QZSS: L1 1575.42MHz, C/A code
- GLONASS: L1 1598.0625MHz ~ 1605.375MHz, C/A code
- Support 99 channels (33 Tracking, 99 Acquisition)
- Acquisition Time (Hot start, Open Sky): 1s (typical)
- Acquisition Time (Cold start, Open Sky): 33s (typical)
- Position Accuracy: 2.5m CEP

GNSS Antenna

General characteristics:

- Patch antenna
- Right Hand Circular Polarization
- Frequency Range – 1575.42MHz $\pm$ 1.023MHz
- Gain – -1.5dBic Typ. @zenith
- Axial ratio – Max 4.0dB @zenith

GNSS Status Indicator

The GPS Status Indicator is a green LED that indicates if the unit has a current GPS position.

When the LED is not on, the GPS is either turned off or it has no current GPS position.

When the LED is flashing, the unit has a current GPS position.